

**University of Pannonia**  
**Doctoral School of Business and Management (GSDI)**



# **Thesis book**

*Local food as a critical factor of sustainable food systems*

## **The consumer perception of local food through different types of proximity**

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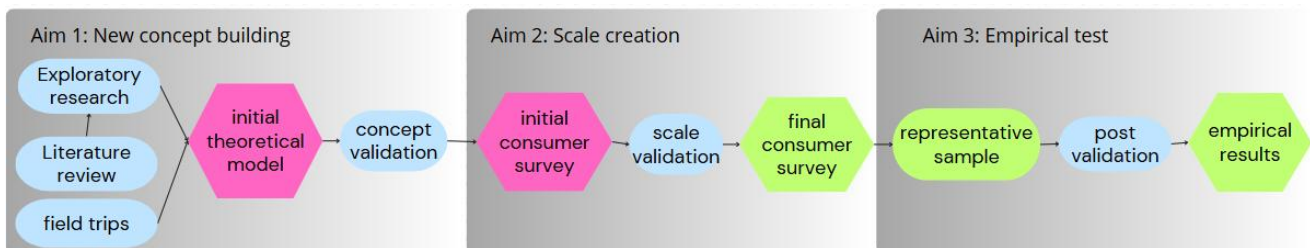
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## Introduction

Ensuring food system sustainability is a pressing global challenge, as current models contribute to environmental, social, and economic problems (Willett et al., 2019; Gerten et al., 2020). In this context, alternative systems like local food networks and short supply chains are gaining relevance. While not a standalone solution, they are essential components of broader transformation efforts. Nonetheless, the concept of "local food" remains ambiguously defined, **often reduced to geographical proximity**, overlooking its emotional, relational, and value-driven aspects (Eriksen, 2013; Fernández-Ferrín et al., 2017).

Despite growing interest, there is **limited empirical research** that examining how consumers perceive local food across different dimensions of proximity. Addressing this gap is crucial for evidence-based policymaking and promoting sustainable food strategies. My dissertation introduces a **proximity-based** framework to explore consumer perceptions of local food, guided by the question: *How do consumers perceive local food through different proximities?* The research uses a **mixed method**, combining qualitative exploration, scale development, and a representative consumer survey in Hungary. Hypotheses examine how proximity influences willingness to pay and purchase frequency, with attention to socio-demographic variation. Grounded in Eriksen's (2013) theory, the study provides conceptual clarity and practical tools for fostering inclusive and context-sensitive food systems.

The flow of the research



Source: *Self-edited figure*

In the first phase I have developed the theoretical framework through literature review, field engagement and exploratory qualitative research. The second phase focused on creating and validating the measurement scale. The third phase empirically tested the model with a representative Hungarian sample.

## *Literature review*

The literature review provides a theoretical foundation by drawing on interdisciplinary research from sustainability science, food science, and consumer behaviour to explore how ‘local food’ is conceptualized across geographic, relational, and value-based dimensions. Adopting a hermeneutic approach, the review engaged iteratively with the literature, integrating diverse perspectives and identifying research gaps. Despite its limitations, this method provided a nuanced understanding of consumer perceptions and informed the study’s conceptual model.

## *Food system sustainability*

Current global food systems are widely recognized as unsustainable due to their severe environmental, economic, and social impacts.

Summary of the main problems of food systems

	<b>Main issues in current food systems</b>	<b>Need for change</b>
<b>Environmental sustainability</b>	Resource overuse (land, water, energy), high GHG emissions, biodiversity loss, soil degradation, food waste, pollution.	Shift to low-impact production and diets, close nutrient loops, cut food loss/waste, protect ecosystems.
<b>Economic sustainability</b>	Inefficiencies, food loss along the chain, unequal access, rising diet-related health costs, exposure to shocks (price/geo).	Equitable, circular, and resilient systems, fair value distribution, support for local economies/SMEs.
<b>Social sustainability</b>	Food insecurity (hidden & overt), obesity and non-communicable diseases, marginalisation of small/traditional farming, erosion of rural communities.	Improve access to healthy food, reconnect producers–consumers, strengthen community resilience and inclusion.

Source: *Self-edited table*

Environmentally, food systems contribute to resource depletion, greenhouse gas emissions, biodiversity loss, and food waste. Economically, inefficiencies, food loss, and unequal distribution drive hunger and health-related costs, while social issues include malnutrition, obesity, and the marginalization of small-scale farmers. Although we could theoretically feed the global population within planetary boundaries, current practices often exceed these limits. Addressing these interconnected challenges requires a holistic, systems-based approach that balances health, equity, and environmental sustainability. Local food systems and short food supply chains cannot solve these issues on their own, yet they are essential building blocks of broader transitions, offering climate resilience and supporting rural livelihoods, particularly relevant in countries like Hungary.

### *Short food supply chains and local food systems*

Recent developments in the food market have brought attention to short food supply chains (SFSCs) and local food systems (LFSs), both emphasizing connections between producers and consumers.

SFSCs are characterized by a reduced number of intermediaries, promoting local production and direct sales, which enhances sustainability across environmental, social, and economic dimensions (Kneafsey et al., 2013). In the EU policy context, SFSCs are also defined through support regulations (Reg. 1305/2013; Reg. 807/2014) as chains with no more than one intermediary, reinforcing transparency and traceability, though these top-down definitions do not always capture bottom-up, community-driven initiatives. However, SFSCs are not universally defined, and their sustainability depends on the specific design and continuous improvement of the supply chain.

Local food systems, like SFSCs, aim to foster community engagement, sustainability, and resilience. LFSs emphasize local production, distribution, and consumption, with varying definitions based on geographic and political contexts (Enthoven and Van den Broeck, 2021). Compared with **SFSCs' value-chain focus**, **LFSs take a broader systems view** (covering actors, activities, and outcomes within a locality) and are promoted in EU strategies such as Farm to Fork for strengthening regional resilience (Wesseler, 2022). Yet the lack of a standardized definition leads to conceptual ambiguity for policy and practice.

SFSCs and LFSs share several characteristics but differ in scope. SFSCs focus on minimising intermediaries, shortening supply chain length, and promoting transparency (Jarzębowski et al., 2020). LFSs extend beyond transactions to include farming practices, public catering, and community development, incorporating all food systems within a locality and emphasizing local economic development and community resilience (Drejerska & Sobczak-Malitka, 2023). In practice, consumers often do not distinguish between the two.

In terms of sustainability, both SFSCs and LFSs offer environmental benefits, such as reduced food miles and greenhouse gas emissions, and promote sustainable land use practices like organic farming (Jarzębowski et al., 2020). Socially, they encourage trust, community cohesion, and local economic development (Kłoczko-Gajewska et al., 2023). Economically, they help small farmers retain a larger share of market value and can generate local multiplier effects, though outcomes remain context-dependent and constrained by logistics, scalability, and market access; in some cases, international markets are more profitable (Augère-Granier, 2016; Stein and Santini, 2022). Overall, effectiveness depends on system design and regional context, which motivates the comparative assessment of benefits and criticisms in the following summary table.

## Summary - benefits and criticisms of local food systems and short food supply chains across the three pillars of sustainability

	<b>BENEFITS</b>	<b>CRITICISMS</b>
<b>ENVIRONMENTAL</b>	<ul style="list-style-type: none"> <li>• Reduced food miles and lower GHG emissions due to shorter transport distances (Jarzębowski et al., 2020; Hoang, 2021)</li> <li>• Use of compostable, recyclable or minimal packaging (Balcom et al., 2023; Hoang, 2021)</li> <li>• Encouragement of sustainable farming practices (organic, regenerative, integrated pest management)</li> <li>• Promoting biodiversity and multifunctional landscapes (Balcom et al., 2023; Ochoa et al., 2020)</li> <li>• Small-scale farmers in SFSCs often more environmentally conscious, relying on diversified and traditional practices (Ricciardi et al., 2021; Stępień et al., 2022)</li> <li>• Improved resource efficiency and circular nutrient flows, e.g. phosphorus (Hoang, 2021)</li> <li>• Reduction of food waste and support for mindful consumption (Hoang, 2021)</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental benefits highly context-dependent, vary by region and supply chain type (Vittersø et al., 2019; Kiss et al., 2019; Majewski et al., 2020)</li> <li>• Consumer travel to access local food may offset sustainability gains (Loiseau et al., 2020)</li> <li>• LCA studies show consumer travel is often the weakest environmental point of SFSCs (Majewski et al., 2020; Mancini et al., 2019); SmartChain (2021) confirms need for innovative logistics</li> <li>• Local food does not always have a lower carbon footprint compared to efficient global systems (Stein and Santini, 2022)</li> <li>• SFSC logistics (small deliveries, face-to-face exchanges) may increase emissions</li> </ul>
<b>SOCIAL</b>	<ul style="list-style-type: none"> <li>• Builds consumer trust and transparency (Benson et al., 2020)</li> <li>• Enhances food literacy and reconnection with food production processes (Diekmann, Gray and Thai, 2020)</li> <li>• Provides access to healthy food, including for low-income groups (Diekmann, Gray and Thai, 2020)</li> <li>• Supports local cohesion, rural livelihoods and urban-rural linkages (Kłoczko-Gajewska et al., 2023; Filippini et al., 2023)</li> <li>• Fosters civic participation and social capital (Granvik, 2017)</li> </ul>	<ul style="list-style-type: none"> <li>• Does not guarantee full food security or significant carbon reductions (Stein and Santini, 2022)</li> <li>• Often targets privileged consumer groups, excluding less affluent populations (Allen et al., 2017; DuPuis and Goodman, 2005; Selfa and Qazi, 2005; Blake et al., 2010)</li> <li>• Conceptual ambiguity: consumers often unaware of distinction between SFSCs and LFSs</li> </ul>
<b>ECONOMIC</b>	<ul style="list-style-type: none"> <li>• Increases farmer income through direct sales and improved price retention (Augère-Granier, 2016; Malak-Rawlikowska et al., 2019)</li> <li>• Significant role in farm turnover in some cases (e.g. 21% of French farms in SFSCs; 40% of them &gt;75% of turnover) (Kneafsey et al., 2013)</li> <li>• 15% of EU farms sell more than half their output directly; yet direct sales only 2% of EU fresh food market (EPRS, 2016)</li> <li>• Small farms dominate EU agriculture: 63.8% of farms &lt;5 ha; family labour provides 86.1% of workforce (Eurostat, 2020a; 2020b)</li> <li>• Strengthens local economies through job creation and multiplier effects (Filippini et al., 2023; Kłoczko-Gajewska et al., 2023)</li> <li>• Supports cultural identity and rural tourism (World Wide Fund for Nature, 2007)</li> <li>• Opportunities for marginalized groups in the context of Industry 4.0 transitions (Manyika et al., 2017)</li> </ul>	<ul style="list-style-type: none"> <li>• Market share remains low despite potential (EPRS, 2016)</li> <li>• Economic outcomes uneven: some producers benefit more from export markets (Stein and Santini, 2022)</li> <li>• Regional and structural differences influence viability (Doenberg et al., 2022; Vittersø et al., 2019)</li> <li>• Employment and income effects vary and remain context-dependent (Chiaverina et al., 2023)</li> </ul>

Source: *Self-edited table*

### *The local food concept*

The concept of local food is widely discussed but lacks a widely accepted definition, making it challenging to apply consistently across contexts. While geographic proximity is often the primary criterion, relational trust, product identity, and cultural significance also play a critical role in how consumers perceive local food. Attributes associated with local food include personal benefits (e.g., taste, health) and public benefits (e.g., environmental impact, support for local economies), with consumer trust being a central factor shaped by transparency and direct interaction with producers. Region-specific traditions and cultural identity further influence consumer preferences, highlighting the symbolic value of local products. Although local food systems and short food supply chains share many features, they are not identical: SFSCs focus on reducing intermediaries, while LFSs emphasize community- and place-based systems. Integrating spatial (geographic), relational, and value-based elements is essential for developing effective policies and understanding consumer behaviour, as definitional ambiguity can hinder both academic discourse and practical implementation.

Summary table about the local food concepts

	<b>Key Points</b>	<b>Geographic proximity</b>	<b>Relational proximity</b>	<b>Value proximity</b>	<b>References</b>
<b>Systematic benefits</b>	LFSs can reduce transport needs, improve perceived freshness/quality, support sustainability, and strengthen local economies. SFSCs minimize intermediaries but are not necessarily local. LFSs may also enhance environmental performance, context-dependently.	Short distances, fewer food miles	Fewer intermediaries, traceability, stronger ties, community benefits	Local identity, authenticity, product symbolism	Feldmann & Hamm, 2015; Chambers et al., 2007; Smith & MacKinnon, 2009; Enthoven & Van den Broeck, 2021
<b>Consumer trust</b>	Trust arises through transparency, traceability, and direct contact. Local food should align with consumer values; small-scale producers rely more on interpersonal/community trust than large-scale ones.	Visibility of origin, local production	Direct producer–consumer interactions, interpersonal trust and reputation	Shared values, ethical alignment	Hinrichs, 2000; Eriksen, 2013; Fernández-Ferrín et al., 2019; László et al., 2024
<b>Cultural &amp; regional</b>	Local food is rooted in regional heritage, tradition, and identity; preferences reflect familiarity and symbolic meaning alongside product cues.	Region-specific products and resources	Cultural ties, local expertise, know-how	Tradition, authenticity, place-linked product identity	Van Ittersum et al., 2003; Fischer & Zeugner-Roth, 2017; Guerrero et al., 2009; Usunier & Cestre, 2007

Source: *Self-edited table*

## Proximity theories

Proximity, often associated with spatial nearness, is a multifaceted concept that plays a central role in how consumers perceive local food. While Euclidean distance is the most intuitive form, proximity also includes social and psychological dimensions. Applying Construal Level Theory (CLT) from psychology highlights that as psychological distance increases, consumers rely on more abstract representations (e.g., sustainability, ethics), while close proximity emphasizes concrete attributes (e.g., freshness, taste). **Thus, perceived proximity shapes not the intensity but the nature of consumers' emotional and cognitive connection to local food, making it a powerful conceptual lens.**

Summary table of main proximity theories

<i>Theory</i>	<i>Main insight</i>	<i>Proximity dimensions</i>	<i>Main literature</i>
<i>Construal Level Theory (CLT)</i>	Psychological distance shapes mental construal and consumer decision-making.	Psychological (temporal, spatial, social, hypothetical)	Trope and Liberman (2003, 2007)
<i>Dual proximity dimensions</i>	Local food is shaped by geographical and social proximity; spatial distance and social interaction.	Geographical, Social/Organizational	Hasanzade et al. (2022); Torre and Rallet (2005)
<i>Triple proximity dimensions</i>	Three dimensions: geographical, relational/social, and value/environmental are commonly used to define local food.	Geographical, Relational/Social, Value/Environmental; Cultural, Geographical, Relational	Eriksen (2013); Tregear (2007)
<i>Multiple proximity dimensions</i>	Expanded proximity framework with up to 9 types; integrates cultural, identity, and technological dimensions.	Geographical, Cognitive, Institutional, Cultural, Identity, Technological, etc.	Boschma (2005); Chicoine et al. (2022)

Source: *Self-edited table*

Several proximity models exist designed for food, what I categorize as **dual, triple, and multiple proximity** frameworks. Dual models (e.g., Hasanzade et al., 2022) emphasize **geographical and social proximity**, while **triple proximity approaches** (such as those by Eriksen (2013)) are most prominent in local food literature.

Eriksen's model (which serves as the conceptual foundation for this research) offers an operationalizable framework, distinguishing between the following proximities:

- **Geographical proximity** refers to the physical distance between food production and consumption. While often equated with localness, its definition is ambiguous and context-dependent. Definitions range from strict distances (e.g., 30 to 100 miles) to broader territorial interpretations. However, a growing number of scholars argue that distance alone is insufficient to define local food.

- **Relational proximity** emphasizes personal, social, and emotional ties between consumers and producers. Direct contact (through farmers' markets, cooperatives, or food networks) builds trust, transparency, and a sense of community. Consumers value the social aspect of food purchasing, seeking connection, authenticity.
- **Value proximity** encompasses product characteristics (e.g., freshness, health, taste, sustainability, packaging) and emotional dimensions (e.g., tradition, pride, identity). This domain reflects the subjective, symbolic meanings attached to local food, such as ethical production, regional identity, and perceived naturalness.

Ultimately, Eriksen's three-domain framework allows for a nuanced understanding of local food, acknowledging its complexity beyond simple geography. It also aligns well with empirical exploration, offering a coherent structure to investigate how different types of proximity influence consumer behaviour and preferences.

### **Consumer perception theory**

Consumer perception theory explains **how individuals interpret and respond to product stimuli**, shaping their purchasing decisions based on both functional and symbolic attributes. In the context of local food, consumers are influenced by sensory cues (e.g., taste, freshness, appearance), emotional associations (e.g., identity, nostalgia), and values (e.g., sustainability, tradition). Perception is selective and interpretive, filtered by prior experience, cultural norms, and social context (Agyekum et al., 2015). Hedonic evaluations emphasise immediate enjoyment (e.g., taste), whereas eudaimonic evaluations reflect longer-term, identity-congruent values (e.g., authenticity, responsibility). Similarly, consumers combine functional appraisals (quality, convenience, safety) with symbolic appraisals (identity expression, belonging), meaning that symbolic values can sometimes outweigh less favourable functional attributes such as price.

Perception is also **socially embedded**. Local food trust is co-produced by objective product cues (taste, quality), represented signals (labels, origin cues), and interpersonal assurances (relationships with producers). Hungarian studies confirm that consumers associate local food with quality, safety, and regional identity, though motivations vary across groups: younger consumers emphasise taste and curiosity, while older generations value tradition and community support (Szente et al., 2014; Szegedyné et al., 2020; Kovács et al., 2022).

This research integrates perception theory with proximity dimensions—geographical, relational, and value-based—offering a framework for understanding how consumers evaluate local food through expected attributes rather than attempting to capture their full experiential journey.

## ***Problem statement***

The concept of local food has received increasing attention in academia, practice, and policy, yet it remains fragmented and contested. This ambiguity creates challenges at multiple levels.

From an **academic perspective**, diverse definitions hinder consistency and comparability across studies, leading to fragmented results and limiting generalisable insights. The meaning of local food has evolved over the years: while earlier interpretations often focused narrowly on distance or administrative boundaries, more recent perspectives highlight relational, cultural, and sustainability dimensions. Older understandings are still frequently applied, even though globalisation, technological change, and shifting consumer values have transformed how “local” is perceived today.

From a **practical perspective**, different stakeholders (producers, retailers, consumers, and policymakers) interpret “local” differently. This complicates branding, labelling, and communication, erodes consumer trust, and makes marketing strategies less effective. Consumers are heterogeneous, and better segmentation could address diverse expectations but also offers an opportunity for more nuanced strategies that can better align products, messages, and policies with consumer values.

From a **policy perspective**, the ambiguity leads to regulatory uncertainty and oversimplification. Frameworks often reduce local food to geographic distance (“food miles”), neglecting relational and value-based aspects, which limits the effectiveness of interventions and strategies.

In addition, **further issues arise** concerning consumer trust, innovation, and sustainability. Ambiguity in definitions risks greenwashing, weakens communication and education, and slows the adoption of innovative supply chain solutions. Health, taste, and quality are often prioritised by consumers over sustainability, creating diverging narratives that policies must reconcile.

This dissertation addresses these gaps by applying a proximity-based framework, offering an empirically grounded approach to understand Hungarian consumers’ perceptions of local food. Based on the problems and research gaps present in the literature, I examine the consumer perception of local food through perceived proximities amongst Hungarian consumers (RQ1), which is general and exploratory in nature. I investigate how perceived proximities influence Hungarian consumers’ understanding of local food (RQ2), how do demographic characteristics influence this

perceived proximity (RQ3), and how does the perception of local food relate to consumers’ willingness to pay (WTP) and purchase frequency (RQ4).

The problem – approach matrix

<b>Problem area and specific challenges</b>	<b>How the dissertation addresses them</b>
<p><b>Academic research</b></p> <ul style="list-style-type: none"> <li>• Divergent definitions, comparability problems.</li> <li>• Fragmented knowledge base due to varied criteria.</li> <li>• Lack of coherent frameworks; when they exist, seldom empirically tested.</li> </ul>	<p>Develops and empirically tests a multidimensional proximity framework (geographic, relational, value). Uses EFA and CFA to establish reliability, validity, and integrative potential. Provides a measurement model to unify fragmented conceptualisations.</p>
<p><b>Practical implementation</b></p> <ul style="list-style-type: none"> <li>• Stakeholders interpret “local” differently.</li> <li>• Marketing and branding face difficulties; inconsistencies undermine trust.</li> <li>• Consumer heterogeneity complicates segmentation.</li> </ul>	<p>Analyses how perceptions vary across demographic groups (age, gender, income). Identifies which proximity dimensions most strongly influence consumer preferences. Offers a framework for segmentation and targeted strategies.</p>
<p><b>Policymaking and development</b></p> <ul style="list-style-type: none"> <li>• Regulatory uncertainty due to unclear definitions.</li> <li>• Reductionist “food miles” approaches ignore cultural and social dimensions.</li> <li>• Consumer perspectives rarely integrated; lack of harmonization hinders comparability.</li> </ul>	<p>Examines the differentiated role of proximity dimensions in willingness to pay and purchase frequency. Provides empirical grounding for policies to move beyond geography and incorporate relational and value-based concerns.</p>
<p><b>Additional considerations</b></p> <ul style="list-style-type: none"> <li>• Inconsistent meanings create labelling and trust issues.</li> <li>• Ambiguity hinders innovation</li> <li>• Ethical and sustainability aspects often overlooked; risk of greenwashing.</li> <li>• Diverging narratives: health/taste/quality vs. sustainability.</li> </ul>	<p>Clarifies how consumers connect (or fail to connect) local food with sustainability, ethics, and health. Distinguishes roles of proximity types in shaping trust, communication, and education. Contributes to clearer narratives and innovation pathways.</p>

Source: *Self-edited table*

### ***Empirical research***

The objective of this dissertation is to develop and empirically validate a multidimensional framework for understanding how consumers perceive local food. Building on Eriksen’s (2013) proximity model, the study conceptualises local food beyond physical distance, incorporating social relationships (relational proximity) and value-based attributes (value proximity). The research was designed in three interrelated phases. First, a **conceptualisation phase**, which combined literature review with exploratory field experiences (e.g. research camps, producer shadowing)

to identify how consumers construct “locality.” Second, an **operationalisation phase**, in which the proximity dimensions were translated into Likert-scale items and developed into a consumer questionnaire. These items underwent expert review, pilot testing, and psychometric validation. Third, an **empirical testing phase**, which applied the validated scale in a nationally representative Hungarian survey, enabling hypothesis testing and analysis of socio-demographic differences in proximity perception.

Triangulation was applied throughout the research to ensure robustness:

- **Methodological triangulation** combined qualitative (free associations, interviews, observation) and quantitative (survey) approaches.
- **Data triangulation** drew on diverse perspectives, including consumers, producers, and experts, and ensured representativeness by gender and generation.
- **Theoretical triangulation** integrated proximity theory (Eriksen, 2013), Construal Level Theory (Trope & Liberman, 2003), and Social Representation Theory (Moscovici, 1961).

A key contribution of the study is the development and validation of a **consumer perception of local food scale**, which allows the three proximity dimensions to be measured and linked to behavioural outcomes such as WTP and purchase frequency. The representative Hungarian data provide novel empirical evidence and advance conceptual clarity in a fragmented field.

Summary of the key elements of the research

<i>Element</i>	<i>Description</i>
<i>Research aim</i>	To develop and empirically validate a multidimensional framework for consumer perceptions of local food
<i>Key constructs</i>	Geographic proximity, relational proximity, value proximity
<i>Conceptualisation</i>	Based on literature review, participatory field experiences (research camps, producer shadowing), and exploratory qualitative research
<i>Operationalisation</i>	Development of Likert-scale items; expert review, pilot testing, EFA, CFA, and reliability/validity checks
<i>Survey instrument</i>	Consumer perception of local food scale (developed and validated)
<i>Sampling strategy</i>	Nationwide Hungarian sample, representative by age and gender
<i>Data collection methods</i>	Mixed methods: qualitative (free association, interviews, observation) and quantitative (survey)
<i>Theoretical frameworks</i>	Proximity theory (Eriksen, 2013), Construal Level Theory (Trope & Liberman, 2003), Social Representation Theory (Moscovici, 1961)
<i>Analytical methods</i>	EFA and CFA, latent variable construction, regression models (linear and quantile), parametric and non-parametric tests

Source: *Self-edited table*

## Theoretical justification of the proposed hypothesis

<b>Hypothesis</b>	<b>Theoretical justification</b>
<p><b>RQ2: What types of proximity influence Hungarian consumers' perception of local food?</b></p>	<p>Eriksen (2013) introduced the three-domain proximity framework (geographic, relational, value) to describe consumer perceptions of local food systems. Fernández-Ferrín et al. (2017) argued that more dimensions shape how consumers interpret localness. Chicoine et al. (2022) expanded the framework by identifying nine forms of proximity, including the three key dimensions. Tregear (2007) and Marsden et al. (2000) emphasized the importance of cultural and social embeddedness in local food systems. Boschma (2005) supported the multidimensionality of proximity in economic geography.</p>
<p><i>H2.1: Hungarian consumers perceive local food through multiple proximity dimensions, including relational and value proximity alongside geographic proximity.</i></p>	<p>Autio et al. (2013) found that older consumers value tradition and self-sufficiency, while younger consumers are motivated by ethics and sustainability. Fernández-Ferrín et al. (2019) demonstrated age-based differences in local food motivations. Wawrzyniak et al. (2005) and Loureiro and Hine (2002) revealed generational variation in perceptions of food quality and risk. Veres (2024) linked generational cohorts to hedonic versus eudaimonic motivations.</p>
<p><b>RQ3: How do demographic characteristics influence Hungarian consumers' perceived proximity of local food?</b></p>	<p>Fischer and Hilboesen (2025) found that women are more responsive to sustainability and ethical food cues. Fernández-Ferrín et al. (2017) observed stronger emotional and symbolic interpretation of local food among women. Bond et al. (2008) and Onozaka and McFadden (2011) confirmed gender-based differences in health and relational attributes. Grebitus et al. (2013) reported greater female preference for freshness and eco-friendly products.</p>
<p><i>H3.1: Consumers' perception of local food varies across different age groups.</i></p>	<p>Hasanzade et al. (2022) reported that income influences accessibility and perceived value of local food. Burchardi et al. (2005) linked socio-economic background to trust and quality perception. Duram and Oberholtzer (2010) and Pearson et al. (2011) noted that higher-income consumers more frequently purchase local food for different reasons.</p>
<p><i>H3.2: Consumers' perception of local food differs between genders.</i></p>	<p>Feldmann and Hamm (2015) found that proximity improves perceived product quality and trust, increasing willingness to pay. Fernández-Ferrín et al. (2019) demonstrated that emotional and ethical closeness influence consumer WTP. Darby et al. (2008) showed that traceability (linked to relational proximity) enhances WTP. Zepeda and Deal (2009), Yue and Tong (2009), and Campbell et al. (2013) emphasized that values and place-based trust raise WTP.</p>
<p><i>H3.3: Consumers' perception of local food varies based on income levels.</i></p>	<p>Schmitt et al. (2018) defined proximity-related indicators predictive of local food behaviours. Fischer and Hilboesen (2025) identified value alignment as influencing purchasing decisions. Naspetti and Bodini (2008) and Weatherell et al. (2003) supported value-driven segmentation in food consumption, linked to frequency of purchase.</p>
<p><b>RQ4: How does the perception of local food relate to consumers' willingness to pay and purchase frequency?</b></p>	<p>Source: <i>Self-edited table</i></p>
<p><i>H4.1: Value proximity, relational proximity, and geographic proximity have an effect on consumers' willingness to pay for local food.</i></p>	
<p><i>H4.2: Value proximity, relational proximity, and geographic proximity have an effect on consumers' purchase frequency of local food.</i></p>	

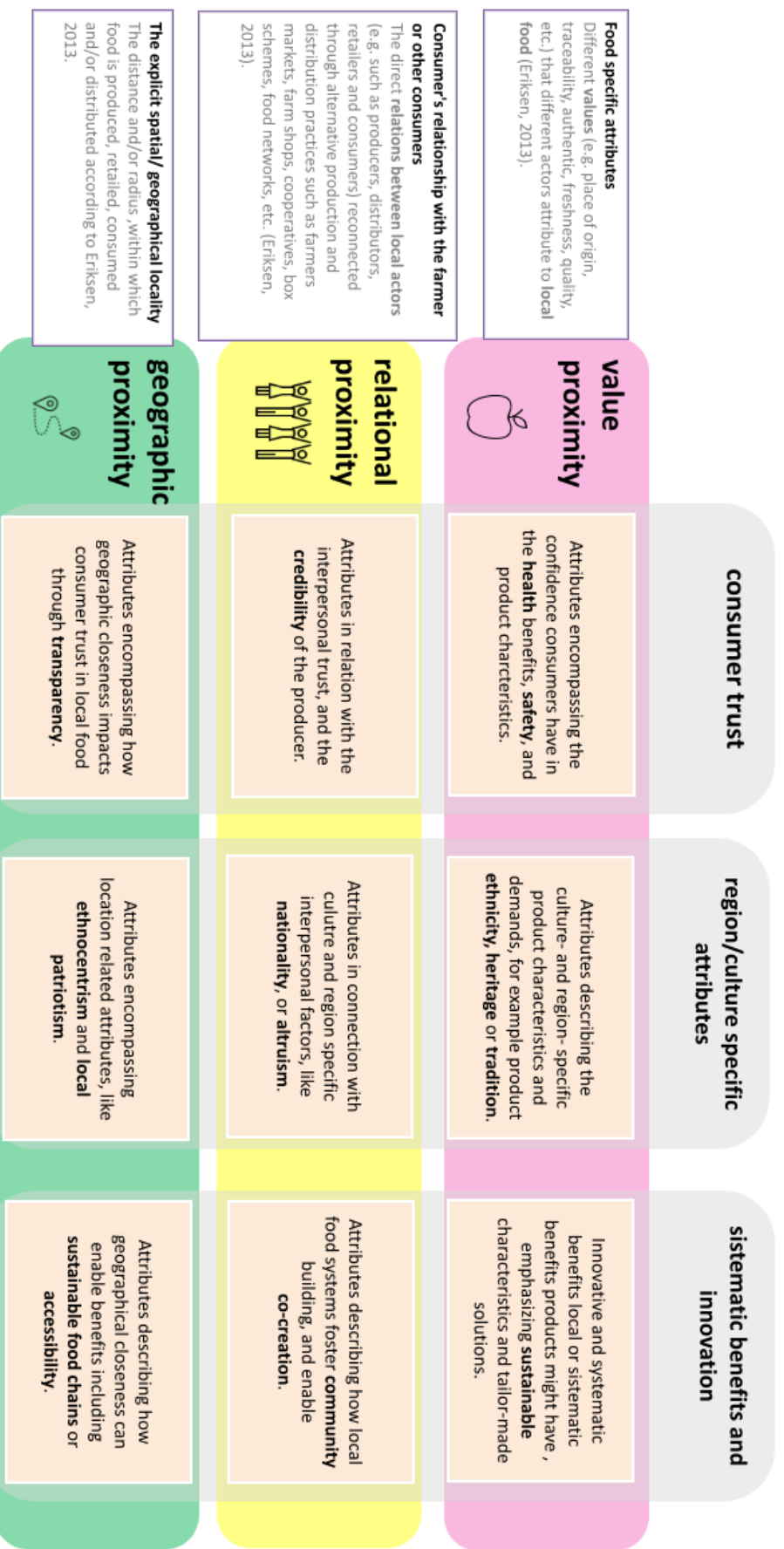
### *Exploratory qualitative research*

The qualitative exploratory research (László and Wahlen, 2024) investigated how Hungarian Gen Z consumers perceive local food, using a qualitative approach grounded in social representation theory. Through fieldwork, market visits, and a free association game (n = 103 participants), the study revealed that consumers' understanding of local food is shaped more by **relational** and **value-based** proximities than by geographical distance. Terms like trust, freshness, and quality formed the central core of social representations, while "local" and "Hungarian" appeared in the periphery, also suggesting a blurred line between local and national food. The association of local food with high cost emerged as a key barrier, especially among younger consumers. These findings challenge traditional spatial definitions and highlight the importance of emotional connections, product characteristics, and affordability. They provide a foundation for the dissertation's proximity-based framework and point to the need for marketing strategies and policy interventions that prioritize transparency, trust, and perceived value over strict geographic criteria.

### *Theoretical framework development*

The theoretical concept was developed by integrating insights from literature and exploratory research. Attributes linked to local food (such as health, ethnocentrism, seasonality, and trust) were categorized using Eriksen's proximity theory (geographic, relational, and value proximity). As the analysis progressed, an additional layer of categorization emerged, revealing three thematic clusters: consumer trust, region- or culture-specific attributes, and systematic benefits. These groupings formed the foundation of the theoretical model. The model was refined through an expert focus group involving doctoral students and further discussions at academic conferences.

In its final form, the framework links each proximity dimension to the three thematic clusters. Value proximity includes product attributes (e.g. healthiness, quality), regional identity (e.g. traditional flavours), and sustainability-driven innovations. Relational proximity reflects trust in producers, shared values, and the community-building role of local food systems. Geographic proximity encompasses spatial closeness, transparency, and attitudes shaped by ethnocentrism or patriotism, alongside logistical benefits like accessibility and reduced food miles. This structured framework captures the multifaceted nature of local food perception and provides a basis for the development of a consumer scale to empirically test the model in the Hungarian context.



### *Consumer scale development and validation*

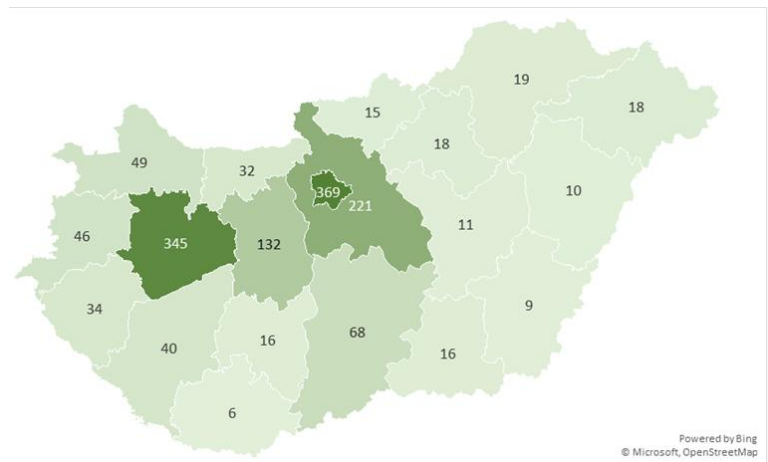
The development of the consumer questionnaire began with the creation of 54 Likert-scale items designed to measure the dimensions of the theoretical model, aligned with the three proximity types (geographic, relational, value). Additional questions addressed willingness to pay, purchase frequency, and demographic variables. Reliability and validity were prioritized throughout, using both qualitative (pilot testing, expert interviews) and quantitative (test-retest, split half, Cronbach’s Alpha, CFA, PCA) methods, both pre- and post-validation were executed. The pilot study with 227 participants confirmed good internal consistency and instrument stability, though some items showed complexity and intercorrelation among proximities. Based on these findings, the final questionnaire was refined through expert feedback and simplified item wording.

### *Representative data collection*

The representative consumer survey in Hungary aimed to reflect the population’s gender and generational distribution based on the 2022 Census. Data collection included both online (n = 1312) and offline (n = 176) formats, yielding **1489 responses**. Initial convenience sampling was followed by targeted efforts (collaborating with pensioner groups, schools and hobby groups) to ensure broader demographic coverage. After quality checks and exclusions for incomplete or invalid responses, and proportional adjustments to match census data, the **final dataset comprised 812 participants**. This refined sample aligns with national demographics for gender and generation, forming a reliable basis for representative analysis.

The distribution of the sample based on generation and gender, compared to the 2022 Hungarian census, and the spread of respondents based on residence on a county level

	Census	Dataset
Female	51.88%	<b>51.97%</b>
Male	48.12%	<b>48.03%</b>
<b>Generations</b>		
	Census	Dataset
Veterans	6.52%	<b>6.53%</b>
Baby Boomers	25.47%	<b>25.49%</b>
X generation	29.56%	<b>29.56%</b>
Y generation	25.38%	<b>25.37%</b>
Z generation	13.08%	<b>13.05%</b>



Source: *Self-edited table and figure*

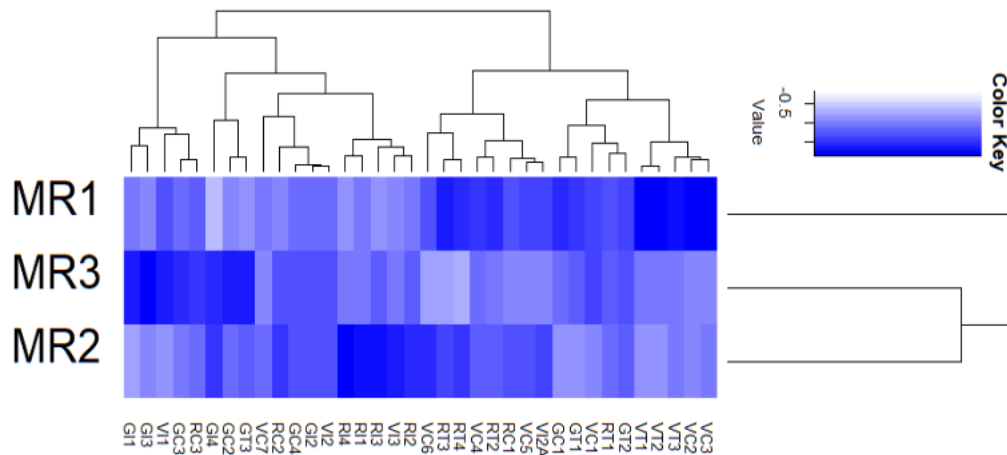
## Examining H2.1

**H2.1:** Hungarian consumers perceive local food through multiple proximity dimensions, including relational and value proximity alongside geographic proximity.

To test this hypothesis, I first estimated the number of latent factors underlying proximity perceptions. A **scree plot** on Spearman correlations indicated a three-factor solution, and a **network-based dimensionality analysis (NDA)** confirmed this by clustering items into three groups, though with cross-loadings. These results aligned with theoretical expectations of a multidimensional structure.

Next, I compared different **factor extraction methods** (PCA, ICA, EFA) using predefined criteria: **interpretability, distinctiveness, allowance for inter-factor correlations, and theoretical coherence**. **PCA** produced factors but with very high correlations, questioning discriminant validity. **ICA** revealed mathematically independent components, but these lacked clear interpretability. **EFA with Promax rotation** yielded the most coherent solution, producing three factors (value, relational, geographic) that were distinct yet interrelated, consistent with proximity theory.

EFA (promax) factor loading structure with hierarchical clustering



Source: *Self-edited figure based on EFA using the psych and gplots packages in R*

To confirm the structure, I conducted **CFA model comparisons**. The three-factor model outperformed a unidimensional model ( $\Delta\text{AIC} \approx 1590$ ;  $\Delta\text{BIC} \approx 1577$ ; CFI = 0.912 vs. 0.721; RMSEA = 0.070 vs. 0.125), and a nested chi-square test showed that treating the factors as one construct worsened fit ( $\Delta\chi^2(3) = 103.14$ ,  $p < 0.001$ ).

Further checks supported the model's robustness:

- **No multicollinearity** (VIF values between 1.7–2.1).
- **Discriminant validity** (HTMT ratios 0.56–0.76 < 0.85).
- **Convergent validity** (CR > 0.84; AVE > 0.50 for value and relational; geographic AVE = 0.478, borderline but acceptable).

**H2.1 is accepted.** Evidence was collected in several steps. First, dimensionality tests (scree plot, NDA) indicated a three-factor solution. Second, extraction methods were compared: PCA and ICA lacked clarity, while EFA with Promax rotation produced interpretable and theory-consistent factors. Third, confirmatory factor analysis confirmed that the three-factor model substantially outperformed a one-factor alternative ( $\Delta AIC = 1590$ ; CFI = 0.912; RMSEA = 0.070). Finally, validity checks supported robustness: no multicollinearity (VIF < 2.5), sufficient discriminant validity (HTMT < 0.85), and strong convergent reliability (CR > 0.84; AVE  $\geq$  0.50, except borderline for geographic). Converging statistical and theoretical evidence supports H2.1: Hungarian consumers perceive local food through a multidimensional framework of value, relational, and geographic proximity.

**Thesis 2.1: Hungarian consumers perceive local food through a multidimensional framework of proximity, shaped by three distinct but interconnected dimensions: geographic, relational, and value-based proximity. These proximity types are empirically distinguishable yet conceptually interrelated, and they jointly influence how consumers interpret the concept of local food. Consumer understanding of locality is therefore inherently multidimensional.**

These results do more than confirm the multidimensionality of proximity; they also establish the measurement framework for the remainder of the study. By empirically distinguishing value, relational, and geographic proximity, the analysis demonstrates that consumer perception of local food cannot be reduced to a single dimension. Each domain highlights different aspects of consumer meaning-making: value proximity links to product-related attributes and perceived values, relational proximity captures interpersonal ties, while geographic proximity reflects accessibility and spatial awareness. This validated three-factor structure provides the **empirical foundation for subsequent hypotheses**, enabling the examination of demographic differences (H3.1–H3.3) and the influence of proximity on willingness to pay and purchase frequency (H4.1–H4.2).

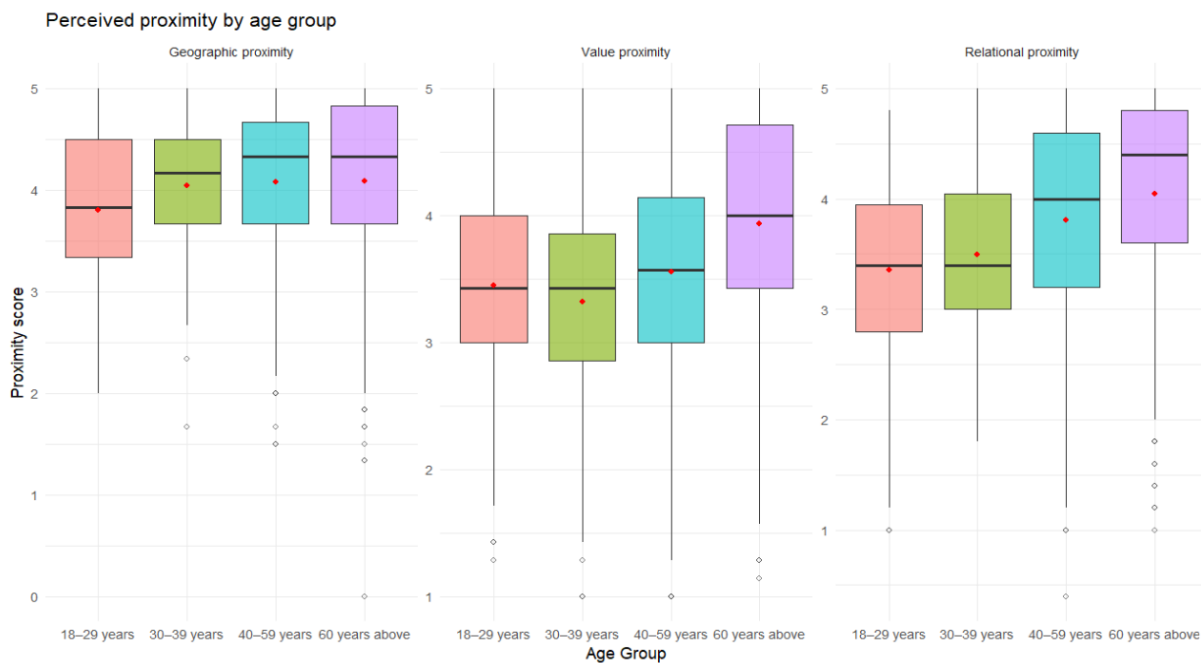
## Examining H3.1

### H3.1: Consumers' perception of local food varies across different age groups.

To test this hypothesis, age groups were defined by chronological age (18–29, 30–39, 40–59, 60+ years). The three proximity dimensions (geographic, value, relational) served as dependent variables. Because the proximity scores showed moderate deviation from normality, both non-parametric (Kruskal–Wallis with Dunn–Bonferroni post-hoc) and parametric tests (ANOVA with Tukey HSD) were applied. This dual approach ensured robustness. Multicollinearity checks confirmed no bias ( $VIF < 2.5$ ).

**Boxplot visualizations** revealed clear differences: the youngest group (18–29) consistently reported the lowest proximity scores, while the oldest (60+) showed the highest across all three dimensions.

Perceived proximity of local food across age groups (geographic, value, relational)

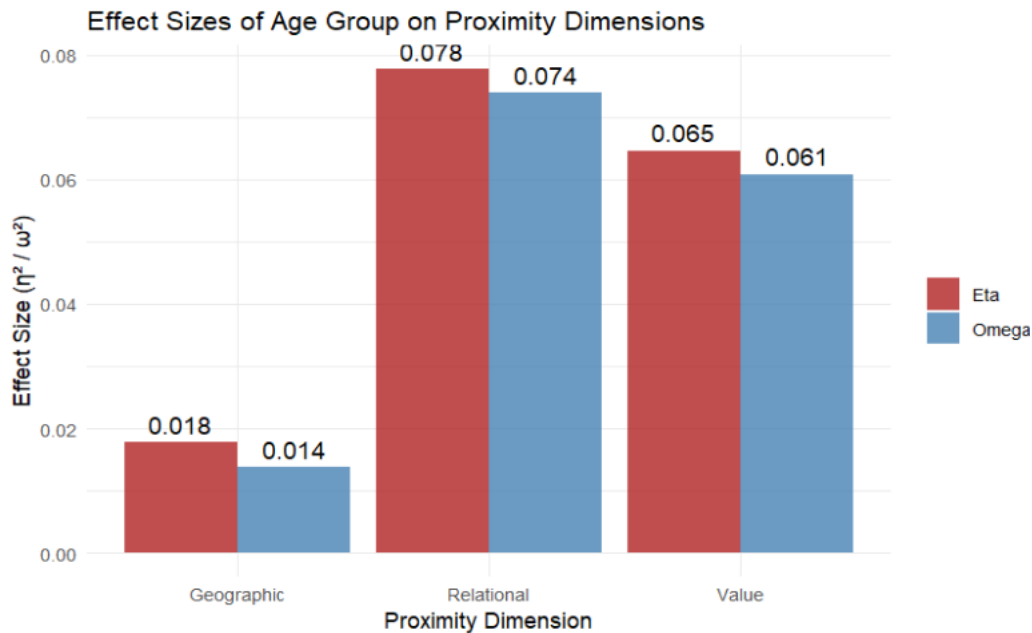


Source: *Self-edited figure using ggplot2 and tidyr packages in R*

The Kruskal–Wallis tests confirmed statistically significant differences between age groups for all three proximity dimensions: geographic ( $\chi^2 = 22.106$ ,  $p < 0.001$ ), value ( $\chi^2 = 55.258$ ,  $p < 0.001$ ), and relational ( $\chi^2 = 79.842$ ,  $p < 0.001$ ). ANOVA results were consistent, reinforcing the robustness of these findings. Post-hoc tests showed especially strong contrasts between the youngest (18–29) and oldest (60+) groups, with relational proximity exhibiting the clearest age gradient.

To assess practical significance, **effect sizes** were calculated. Geographic proximity showed small effects ( $\eta^2 = 0.018$ ), value proximity moderate effects ( $\eta^2 = 0.065$ ), and relational proximity the strongest ( $\eta^2 = 0.078$ ), highlighting that social-emotional aspects of local food are most influenced by age.

Effect sizes ( $\eta^2$  and  $\omega^2$ ) of age group on proximity dimensions (geographic, value, relational)



Source: *Self-edited figure using effectsize, ggplot2, dplyr and tidyr packages in R*

**H3.1 is accepted.** The Kruskal–Wallis tests confirmed significant age-group differences across all three proximity dimensions (geographic:  $\chi^2 = 22.106$ ,  $p < 0.001$ ; value:  $\chi^2 = 55.258$ ,  $p < 0.001$ ; relational:  $\chi^2 = 79.842$ ,  $p < 0.001$ ). Post-hoc Dunn tests showed that the youngest group (18–29) scored significantly lower than older cohorts, especially in relational and value proximity. These results were consistent with the ANOVA models ( $F = 4.61$ – $21.59$ , all  $p < 0.01$ ). Effect sizes further highlighted the strength of these differences: small for geographic ( $\eta^2 = 0.018$ ), moderate for value ( $\eta^2 = 0.065$ ), and moderate-to-large for relational proximity ( $\eta^2 = 0.078$ ). Boxplots and subgroup structures also confirmed a clear age gradient, with the 60+ group showing the strongest perceptions and the 18–29 group the weakest.

**Thesis 3.1: Consumers' perception of local food proximity varies across age groups, with older individuals reporting higher levels of geographic, value-based, and especially relational proximity. This suggests that age plays a crucial role in shaping how individuals connect with local food, with the oldest age group (60+) consistently demonstrating the strongest perceived ties and the youngest cohort (18–29) showing the weakest connections across all proximity dimensions.**

## Examining H3.2

### H3.2: Consumers' perception of local food varies across different genders.

Since proximity scores did not follow a normal, non-parametric tests were applied. The Wilcoxon rank-sum test was used to examine whether men and women differ in their perceived proximity across the conceptual dimensions. To complement significance testing, Cliff's  $\delta$  was calculated as a robust effect size measure, while descriptive statistics provided further context. A boxplot visualised gender-specific distributions. The Wilcoxon tests indicated significant differences in all three proximity dimensions, with women consistently reporting higher proximity scores:

- **Geographic proximity:**  $W = 83,810$ ,  $p < 0.001$ ,  $\delta = 0.165$  (95% CI: 0.084–0.245)
- **Relational proximity:**  $W = 82,781$ ,  $p < 0.001$ ,  $\delta = 0.151$  (95% CI: 0.069–0.231)
- **Value proximity:**  $W = 82,617$ ,  $p < 0.001$ ,  $\delta = 0.149$  (95% CI: 0.067–0.229)

All Cliff's  $\delta$  values fall within the “small” effect size range, but their confidence intervals excluded zero, confirming robust gender differences.

Wilcoxon test results and Cliff's Delta effect sizes for gender differences in perceived proximity

<i>Proximity Dimension</i>	<i>Wilcoxon p-value</i>	<i>Cliff's <math>\delta</math></i>	<i>95% CI</i>	<i>Effect Size</i>
<i>Geographic</i>	< 0.001	0.165	0.084–0.245	Small
<i>Relational</i>	< 0.001	0.151	0.069–0.231	Small
<i>Value</i>	< 0.001	0.149	0.067–0.229	Small

Source: *Self-edited table based on own calculation : Wilcoxon rank-sum tests (stats package) and Cliff's Delta (effsize package) in R.*

Descriptive statistics showed that women's median scores were higher across all dimensions (geographic: 4.33 vs. 4.00; relational: 4.00 vs. 3.60; value: 3.86 vs. 3.57), aligning with the effect size estimates. Boxplots confirmed these results: women's distributions are consistently shifted upward, despite overlapping interquartile ranges.

**H3.2 is accepted** Wilcoxon rank-sum tests showed significant gender differences in all proximity dimensions ( $p < 0.001$ ), Cliff's  $\delta$  values (0.15–0.17) indicated small but robust effects with confidence intervals excluding zero, descriptive statistics confirmed consistently higher medians for women (e.g. 4.33 vs. 4.00 in geographic proximity), and boxplot visualisations illustrated upward shifts in women's distributions across all dimensions, demonstrating that women systematically perceive local food as more proximate than men.

**Thesis 3.2: Gender plays a substantial role in shaping consumer perceptions of local food. Women consistently report a stronger sense of geographic, relational, and value-based proximity compared to men.**

### Examining H3.3

#### H3.3: Consumers' perception of local food varies based on income.

To examine Hypothesis 3.3, I combined non-parametric and regression-based analyses. Income was measured on a five-point ordinal scale, ranging from “very tight” to “significantly above average,” and was recoded into three ordered categories: below average, average, and above average, to ensure balanced group sizes.

Non-parametric **Kruskal–Wallis tests** were first conducted for each proximity dimension. Significant group differences were observed for **geographic proximity** ( $\chi^2(2) = 12.25$ ,  $p = 0.0022$ ) and **value proximity** ( $\chi^2(2) = 13.43$ ,  $p = 0.0012$ ), while **relational proximity** showed only borderline significance ( $\chi^2(2) = 5.93$ ,  $p = 0.0514$ ).

Post-hoc Dunn tests clarified the group-level contrasts. For **geographic proximity**, respondents in the below-average income group reported significantly higher scores than both the average ( $p = 0.0008$ ) and above-average groups ( $p = 0.0281$ ).

For **value proximity**, the above-average income group reported significantly lower scores than both the average ( $p = 0.0034$ ) and below-average groups ( $p = 0.0019$ ).

For **relational proximity**, no robust differences were observed; only one marginal contrast emerged (average vs. above average,  $p = 0.0326$ ), which did not survive Bonferroni adjustment.

To complement the group-based tests, median ( $\tau = 0.5$ ) **quantile regression** was applied. This allowed testing for directional effects while addressing the non-normal distribution of proximity scores.

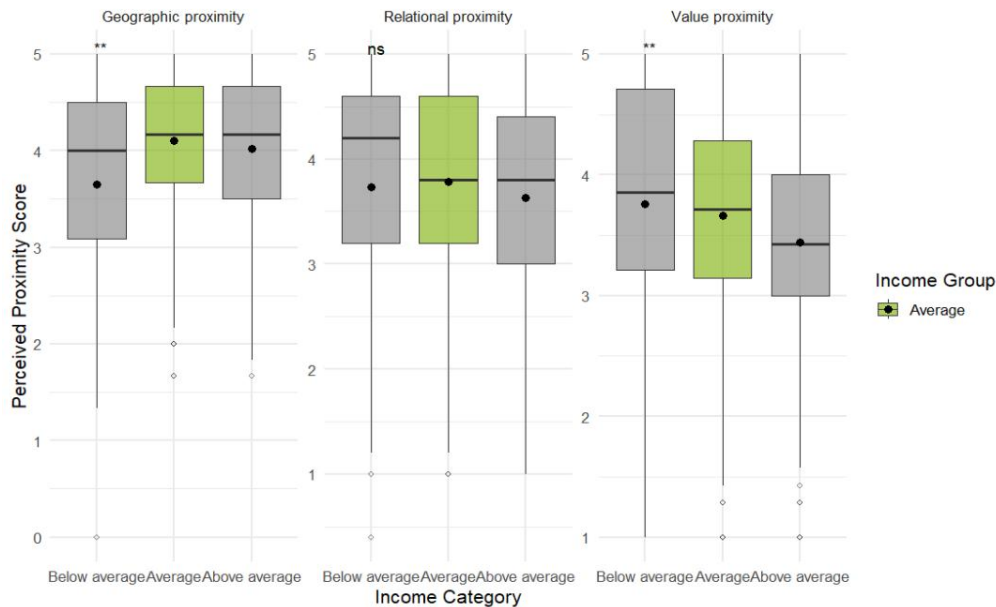
Quantile regression results ( $\tau = 0.5$ ) for the effect of income on perceived proximity

<i>Proximity</i>	<i><math>\beta</math> Coeff.</i>	<i>95% CI</i>	<i>Sig.?</i>	<i>Explanation</i>
<b>Geographic</b>	0.167	[-0.71, 0.17]	No	Weak positive trend, not significant
<b>Value</b>	-0.143	[-0.61, -0.14]	Yes	Significant negative effect
<b>Relational</b>	-0.300	[-0.30, 0.66]	No	No meaningful effect

Source: *Self-edited table based on own calculation: quantile regression using the quantreg package*

Value proximity showed a significant negative association with income ( $\beta = -0.143$ ; 95% CI [-0.61, -0.14]), confirming that higher-income respondents perceive lower value proximity. Geographic proximity showed a weak positive trend ( $\beta = 0.167$ ) but was not statistically significant (95% CI [-0.72, 0.17]). Relational proximity again showed no significant effect ( $\beta = -0.200$ ; 95% CI [-0.81, 0.81]).

### Effect of income on local food perception across three proximity types (boxplot)



Source: *Self-edited figure using R with the ggplot2, dplyr, tidyr, and ggpubr packages*

**Boxplots** illustrated the distribution of proximity scores across the three income groups. The plots support the statistical findings: for geographic proximity, below-average income respondents consistently scored higher, aligning with the Dunn post-hoc contrasts. For value proximity, above-average respondents scored lower than both other groups, confirming the negative trend observed in quantile regression. For relational proximity, distributions were highly similar across income groups, reinforcing the absence of significant effects.

**H3.3 is partially accepted.** Significant Kruskal–Wallis results indicate that **income affects geographic and value proximity, but not relational proximity.** **Dunn post-hoc tests** highlight that lower-income consumers perceive stronger geographic ties and greater value-based closeness, while higher-income groups rate value proximity lower. **Quantile regression** strengthens this conclusion by showing a significant negative effect of income on value proximity, while confirming the non-significance of relational and geographic proximity. Finally, **boxplots** visually confirm the downward trend in value and geographic proximity with increasing income, alongside stable relational perceptions.

**Thesis 3.3: Income shapes how consumers perceive geographic and value proximity of local food, with lower-income groups reporting stronger spatial ties and greater importance on perceived value. Relational proximity remains stable across income groups, suggesting that relational closeness to local food is independent of financial status.**

## Examining H4.1

**RQ4:** Value proximity, relational proximity, and geographic proximity have an effect on consumers' willingness to pay for local food.

To examine whether proximity perceptions influence consumers' willingness to pay (WTP), I first explored the distribution of WTP values. The histogram revealed a strongly right-skewed pattern with several extreme outliers. Diagnostic tests confirmed significant non-normality (Shapiro–Wilk  $W = 0.936$ ,  $p < 0.001$ ) and heteroskedasticity (Breusch–Pagan test  $p = 0.005$ ). These results justified the use of quantile regression as a more robust method.

Quantile regression results provided clear evidence that value proximity exerts the strongest and most consistent influence on WTP. Its coefficients increased steadily across quantiles, reaching significance at all levels, and peaking at the 75th percentile ( $\beta = 2.58$ , 95% CI [1.27, 3.38]).

Quantile regression coefficients for WTP and proximities

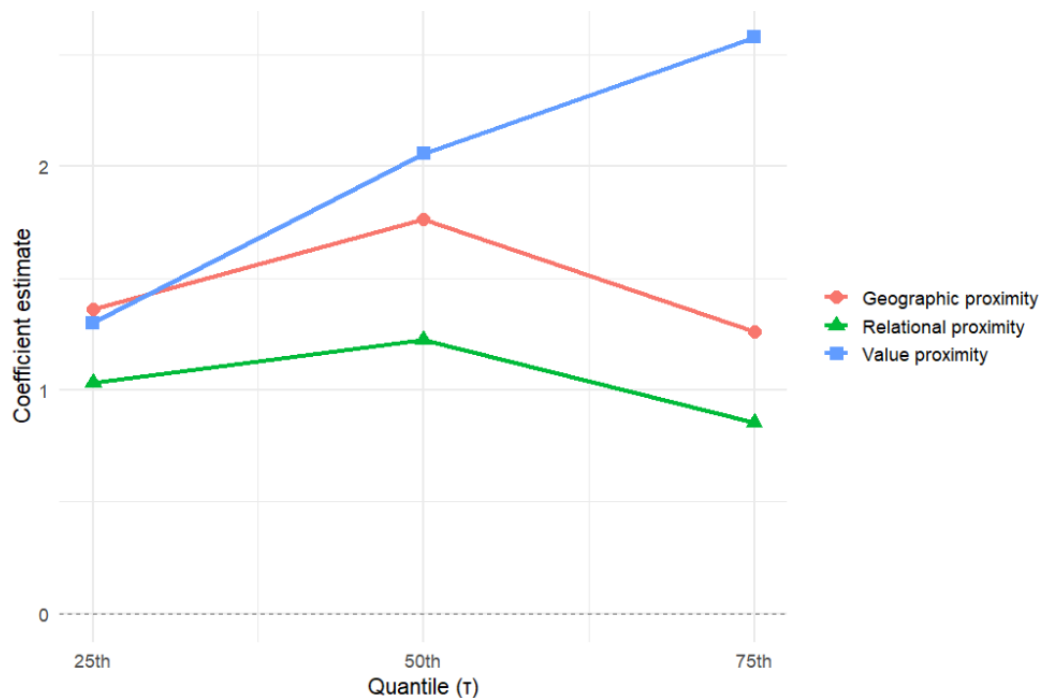
Quantile	Variable	Coefficient	Lower Bound	Upper Bound
0.25	Geographic proximity	1.3636	0.9376	2.2528
0.5		1.7647	0.3389	2.6984
0.75		1.2632	-0.9002	1.9443
0.25	Relational proximity	1.0331	-0.0694	1.9751
0.5		1.2255	0.3233	2.4070
0.75		0.8553	-0.0411	1.9898
0.25	Value proximity	1.3017	0.3779	2.2637
0.5		2.05882	0.9982	2.8313
0.75		2.5790	1.2735	3.3802
0.25	Intercept	-6.1157	-8.3007	-4.3768
0.5		-5.1471	-7.8733	-1.3376
0.75		2.1974	-0.9523	11.1022

Source: *Self-edited table*

This demonstrates that high-WTP consumers are especially sensitive to value-based attributes of local food. Geographic proximity also showed significant effects, particularly at the median level ( $\beta = 1.76$ , 95% CI [0.34, 2.70]), though the effect weakened toward the upper end of the distribution. Relational proximity, by contrast, had a weaker and less stable influence: significance appeared only at the median ( $\beta = 1.23$ , 95% CI [0.32, 2.41]), with confidence intervals crossing zero at lower and higher quantiles.

These patterns are visually summarized in the coefficient plot below, which plots the quantile regression coefficients across proximity dimensions.

Quantile regression coefficients for value, relational, and geographic proximity



Source: *Self-edited figure using R (quantreg and ggplot2 packages)*

The figure highlights the increasing dominance of value proximity toward higher quantiles, the mid-level relevance of geographic proximity, and the consistently weaker role of relational proximity.

**H4.1 is accepted** WTP was non-normal (Shapiro–Wilk  $W = 0.936$ ,  $p < 0.001$ ) and heteroskedastic (Breusch–Pagan  $BP = 12.73$ ,  $p = 0.0053$ ), supporting the use of quantile regression. The models showed that value proximity had the strongest and consistent effect across quantiles, peaking at the 75th percentile ( $\beta = 2.58$ , 95% CI [1.27, 3.38]); geographic proximity was significant at the 25th ( $\beta = 1.36$ , 95% CI [0.94, 2.25]) and 50th percentiles ( $\beta = 1.76$ , 95% CI [0.34, 2.70]), but not at the 75th; relational proximity was weaker, significant only at the median ( $\beta = 1.23$ , 95% CI [0.32, 2.41]). The coefficient plot confirmed these heterogeneous patterns.

**Thesis 4.1: Consumers’ willingness to pay for local food is shaped by all three proximity dimensions. Value-based proximity emerges as the strongest and most consistent determinant, particularly among high-WTP consumers. Geographic proximity plays a moderate role, especially at lower and median WTP levels, but its influence diminishes among those willing to pay more. Relational proximity shows a weak yet relatively stable effect.**

## Examining H4.2

**H4.2:** Value proximity, relational proximity and geographic proximity have an impact on consumers' purchase frequency regarding local food.

To test H4.2, I combined machine learning and regression techniques. Purchase frequency was recoded into four categories (rarely, monthly, weekly, daily). The rationale for using both methods was that proximity dimensions might exert nonlinear and level-specific effects that cannot be fully captured by a single statistical model. First, a random forest classifier was applied to explore the predictive relevance of the three proximity dimensions.

Boruta feature importance results

Variable	Mean importance	Median importance	Min importance	Max importance	Normalized hits	Decision
Geographic proximity	8.24	7.36	5.71	12.26	1	Confirmed
Relational proximity	-1.25	-1.27	-3.9	3.05	0.05	Rejected
Value proximity	4.59	4.47	1.86	8.08	0.84	Confirmed

Source: Self-edited table based on output of the Boruta package in R.

While the full model achieved high training accuracy, test accuracy was low, suggesting overfitting. To further examine this, I used the Boruta feature selection algorithm, which confirmed **geographic proximity (mean importance = 8.24)** and **value proximity (4.59)** as relevant predictors, while **relational proximity (-1.25)** was rejected as uninformative. This indicated that consumer purchase frequency is most strongly explained by geographic and value proximity.

Second, multinomial logistic regression was employed to test the statistical significance and direction of effects across purchase frequency levels.

Multinomial logistic regression summary

Outcome	Predictor	Coefficient	Odds ratio	p-value	Significance
Monthly N=236	Geographic	0.198	1.22	0.31	Not sig.
	Relational	0.027	1.03	0.893	Not sig.
	Value	0.251	1.29	0.186	Not sig.
Weekly N=387	Geographic	0.615	1.85	0.002	Significant
	Relational	0.008	1.01	0.967	Not sig.
	Value	0.518	1.68	0.006	Significant
Daily N=71	Geographic	0.033	1.03	0.894	Not sig.
	Relational	0.586	1.8	0.028	Significant
	Value	0.519	1.68	0.037	Significant

Source: Self-edited table based on `nnet::multinom()` output in R.

The results showed that:

- Value proximity significantly increased the odds of weekly (OR = 1.68,  $p = 0.006$ ) and daily (OR = 1.68,  $p = 0.037$ ) purchases.
- Geographic proximity had a significant effect only for weekly purchases (OR = 1.85,  $p = 0.002$ ).
- Relational proximity showed no consistent influence, with only a weak effect at the daily level (OR = 1.80,  $p = 0.028$ ).

Taken together, the two approaches provide convergent evidence. The random forest analysis emphasized predictive importance, identifying geographic and value proximity as the decisive factors, while multinomial regression confirmed their statistical significance, particularly for weekly and daily purchases. Relational proximity, by contrast, was consistently weak and largely non-significant. Evidence from feature selection and regression analyses shows that **value proximity and geographic proximity significantly influence purchase frequency**, while relational proximity has only marginal impact.

**H4.2 is partially accepted** Boruta feature selection identified geographic proximity (mean importance = 8.24) and value proximity (4.59) as important predictors, while relational proximity was rejected (-1.25). Multinomial logistic regression confirmed that value proximity significantly increased weekly (OR = 1.68,  $p = 0.006$ ) and daily (OR = 1.68,  $p = 0.037$ ) purchase likelihood, and geographic proximity had a significant effect on weekly purchases (OR = 1.85,  $p = 0.002$ ). Relational proximity showed no consistent influence, with only a weak effect at the daily level (OR = 1.80,  $p = 0.028$ ). These converging results demonstrate that value and geographic proximity shape purchase frequency, whereas relational proximity exerts little effect.

**Thesis 4.2: Consumers' purchasing frequency of local food is primarily influenced by perceived value and geographic proximity, while relational proximity has only a limited impact.**

## Summary of the examination of hypotheses and research questions

Hypothesis	Justification	Thesis statement
H2.1: Hungarian consumers perceive local food through multiple proximity dimensions, including relational and value proximity alongside geographic proximity.	Confirmed by NDA, scree plot, and EFA with Promax rotation. Three distinct but correlated factors identified: value, relational, and geographic proximity. CFA supported three-factor model over one-factor. Reliability, discriminant and convergent validity confirmed.	Hungarian consumers perceive local food through a multidimensional framework of proximity, shaped by three distinct but interconnected dimensions: geographic, relational, and value-based proximity. These proximity types are empirically distinguishable yet conceptually interrelated, and they jointly influence how consumers interpret the concept of local food. <b>Consumer understanding of locality is therefore inherently multidimensional.</b>
H3.1: Consumers' perception of local food varies across different age groups.	Kruskal–Wallis tests, Dunn post-hoc tests, ANOVA, and Tukey HSD showed significant differences across all three proximity dimensions. Older consumers (60+) consistently showed higher perceived proximity. Effect sizes moderate to large for value and relational proximity.	Consumers' perception of local food proximity varies significantly across age groups, with older individuals reporting higher levels of geographic, value-based, and especially relational proximity. This suggests that <b>age plays a role in shaping how individuals connect with local food</b> , with the oldest age group (60+) consistently demonstrating the strongest perceived ties and the youngest cohort (18–29) showing the weakest connections across all proximity dimensions.
H3.2: Consumers' perception of local food differs between genders.	Wilcoxon tests significant ( $p < 0.001$ ) for all proximity dimensions. Cliff's Delta showed small but consistent effect sizes. Women report higher proximity perceptions across all dimensions.	Gender plays a substantial role in shaping consumer perceptions of local food. <b>Women consistently report a stronger sense of geographic, relational, and value-based proximity</b> compared to men.
H3.3: Consumers' perception of local food varies based on income levels.	Kruskal–Wallis and Dunn tests showed significant differences in geographic and value proximity, not in relational. Quantile regression confirmed only value proximity as significant (negative trend with income).	Income shapes how consumers perceive geographic and value proximity of local food, with lower-income groups reporting stronger spatial ties and greater importance on perceived value. Relational proximity remains stable across income groups, suggesting that <b>relational closeness to local food is independent of financial status.</b>
H4.1: Value proximity, relational proximity, and geographic proximity have an effect on consumers' willingness to pay for local food.	Quantile regression shows that value proximity is the strongest and most consistent predictor across WTP quantiles. Geographic proximity is significant at lower/median levels; relational proximity shows weaker but visible effect at the median.	Consumers' willingness to pay for local food is shaped by all proximity dimensions. <b>Value proximity emerges as the strongest and most consistent determinant, particularly among high-WTP consumers.</b> Geographic proximity plays a moderate role, especially at lower WTP levels. Relational proximity shows a weak yet relatively stable effect.
H4.2: Value proximity, relational proximity, and geographic proximity have an effect on consumers' purchase frequency of local food.	Random forest and Boruta confirmed geographic and value proximity as predictors. Multinomial regression showed value proximity predicts weekly and daily purchases, geographic proximity significant for weekly. Relational proximity has inconsistent overall effect.	Consumers' purchasing frequency of local food is primarily influenced by perceived value and geographic proximity, while relational proximity has only a limited impact.

Source: *Self-edited table*

## *Answering the research questions*

### **RQ1: How do Hungarian consumers define and interpret the concept of local food?**

The study reveals that Hungarian consumers do not define local food based solely on physical distance or administrative boundaries. Instead, their interpretation reflects a **multidimensional understanding** that combines perceived geographic, social, and value proximity. The findings underscore that "local" is not a fixed or purely geographic label, but a **symbolic and value-laden concept** shaped by emotional, cultural, and ethical considerations.

### **RQ2: What types of proximity influence Hungarian consumers' perception of local food?**

The results confirm that Hungarian consumers' perception of local food is shaped by three interrelated forms of proximity: geographic, relational, and value based. This **multidimensional structure** was revealed through network-based dimensionality analysis (NDA), validated by exploratory factor analysis (EFA) with both varimax and promax rotations, and statistically confirmed by confirmatory factor analysis (CFA). These findings demonstrate that consumers do not interpret local food solely in terms of physical distance, but also based on emotional, social, and ethical connections.

### **RQ3: How do demographic characteristics influence Hungarian consumers' perceived proximity of local food?**

The analysis indicates that some demographic factors (**age, gender, and income**) play an important role in shaping proximity perceptions. Older consumers show stronger perceived relational and value proximity, suggesting that age-related factors influence how consumers relate to local food. Gender-based differences were observed across all three dimensions, with **women** reporting higher proximity perceptions, consistent with their central role in food-related decisions. Income also influences proximity perception, particularly for geographic and value proximity, indicating that **social closeness to local food is independent of financial status**. These findings highlight the need for demographically tailored strategies in both marketing and policymaking.

### **RQ4: How does the perception of local food relate to consumers' willingness to pay (WTP) and purchase frequency?**

The results reveal that **value proximity is the most consistent and strongest predictor of both willingness to pay (WTP) and purchase frequency**. Consumers who perceive strong alignment between their values and the characteristics of local food are more willing to pay a premium and to buy these products more frequently. Geographic proximity also influences behaviour but is particularly relevant for consumers with lower WTP levels, indicating that physical accessibility plays a greater role for price-sensitive groups. Relational proximity, while moderately associated with WTP, has a weak and inconsistent effect on purchase frequency. These findings suggest that consumer commitment to local food is driven primarily by shared values and accessibility, while relational aspects play a complementary role, with important implications for segmentation, communication strategies, and policy design.

## ***Discussion and conclusions***

This dissertation demonstrates that Hungarian consumers perceive local food through a **multidimensional proximity framework** consisting of value-based, relational, and geographic dimensions (H2.1). This confirms Eriksen's (2013) theory and aligns with international findings that "local" is interpreted not only as geographic distance but also as cultural value and trust (Brune et al., 2023; Aprile et al., 2016). It also shows an evolution in Hungary: earlier studies stressed distance and direct sales (Csíkné Mácsai, 2014), whereas more recent research and my findings highlight sustainability and cultural values (Nagy-Pető, 2024; Szegedyné Fricz et al., 2020).

**Consumer preferences** were strongly oriented towards local food (61.9%), consistent with earlier Hungarian results (Szente et al., 2014: 64.4%), resonating with Hungarian evidence that consumers associate local food with freshness and safety (Kovács et al., 2022), and with international findings that authenticity and quality often outweigh distance (Feldmann and Hamm, 2015; Haas et al., 2021).

**Demographic differences** were consistent with prior research. Older consumers showed stronger relational and value ties, as reported elsewhere (Choe and Kim, 2019; Sengel et al., 2015), while Generation Z proved weaker. Women scored higher across all proximities, supporting earlier studies on gender orientation (Feldmann and Hamm, 2015; Okumus et al., 2021). Lower-income groups emphasised value and geographic proximity, reflecting affordability concerns, extending prior mixed evidence on income effects (Cranfield et al., 2012; Vuksanović et al., 2017).

**Willingness to pay (WTP)** was high (88% of respondents, 18% average premium), close to Hungarian results of 20.7% premium by Kiss et al. (2020) but below international averages of 30–35% (Mustapa and Kallas, 2025). Consistent with Feldmann and Hamm (2015) and Hempel and Hamm (2016), value proximity was the strongest driver, geographic mattered moderately, and relational proximity was weak. This pattern confirms that quality and trust are central to WTP but also reinforces the intention–behaviour gap (Printezis et al., 2019).

**Purchase frequency** was primarily shaped by geographic proximity, followed by value, while relational proximity had secondary effects. This reflects earlier findings that convenience and access are decisive for routine purchases (Birch et al., 2018; Carfora and Catellani, 2023), while relational trust fosters loyalty rather than frequency (Memery et al., 2015). My study adds Hungarian evidence that relational proximity strengthens habitual buying but cannot replace access.

Overall, separating proximity dimensions proved essential. Value proximity drives aspirational behaviour (WTP), geographic proximity governs regular purchasing, and relational proximity builds a basis for that. This multidimensionality extends earlier

conclusions that geography alone cannot explain local food preference (Feldmann and Hamm, 2015; Wenzig and Gruchmann, 2018).

Finally, the results connect to broader debates on **food system transformation**: value proximity supports sustainable diets (Willett et al., 2019), geographic proximity strengthens resilience through shorter supply chains (Doernberg et al., 2022), and relational proximity fosters trust and social capital (Michel-Villarreal, 2022).

Comparison of dissertation results with existing literature

<i>Hypothesis</i>	<i>Literature evidence</i>	<i>Dissertation's findings</i>	<i>Contribution</i>
<i>H2.1 Multidimensional construct</i>	“Local food” variably linked to distance, borders, or symbolic values (Brune et al., 2023; Aprile et al., 2016; Eriksen, 2013)	Three proximities validated: value, relational, geographic	Confirms multidimensionality, first empirical validation
<i>H3.1 Age differences</i>	Older adults value health, tradition; younger focus on novelty (Choe and Kim, 2019; Sengel et al., 2015)	Older report higher relational and value proximity; Gen Z weakest ties	Consistent with international findings
<i>H3.2 Gender differences</i>	Women more health/ethics oriented (Feldmann and Hamm, 2015; Okumus et al., 2021)	Women score higher on all proximities, small but robust effect	Confirms prior evidence in Hungarian context
<i>H3.3 Income differences</i>	Mixed evidence; income weak predictor (Cranfield et al., 2012)	Lower income = stronger value and geographic; relational stable	Adds nuance: affordability/access dimension
<i>H4.1 WTP</i>	Value and quality strongest predictors; intention–behaviour gap (Feldmann and Hamm, 2015; Hempel and Hamm, 2016)	88% willing to pay more; value strongest, geographic moderate, relational weak	Confirms international pattern, quantifies Hungarian premium (18%)
<i>H4.2 Frequency</i>	Convenience and access critical (Birch et al., 2018); relational trust relevant for loyal buyers (Memery et al., 2015)	Geographic strongest, value also important, relational weak overall but stronger for regular buyers	Extends literature: relational might enhance loyalty but not frequency

Source: *Self-edited table*

## Limitations

This doctoral research has several limitations. The applied methods (EFA, CFA, non-parametric tests, Random Forest, quantile regression) reveal associations but not causal mechanisms. The sample, though diverse, is not fully representative of Hungary, with regional biases. Self-reported, cross-sectional data may include desirability effects and cannot track changes over time. In addition, certain aspects (such as producer perspectives, intervention effects, or cross-country comparisons) were beyond the scope of this study.

## ***Research utility***

This dissertation offers contributions for academia, practice, and policy by empirically validating a **multidimensional proximity framework** of local food perception. Consumers interpret “local” not only as geographic closeness but also through value-based and relational dimensions, which play asymmetric roles in shaping behaviour.

## **Academic utility**

The study advances theory by **validating a three proximity concept** (value, relational, geographic), confirmed through CFA as superior to a one-factor alternative (H2.1). This demonstrates that local food perception is inherently multidimensional.

The findings reveal **systematic demographic variation**. Older consumers reported higher value and relational proximity (H3.1), while younger groups (especially Gen Z) showed weaker ties. Women scored higher across all proximities (H3.2), while lower-income groups expressed stronger value and geographic proximity, with relational proximity stable across income levels (H3.3).

Proximity perceptions also proved **behaviourally relevant**. Value proximity was the strongest and most consistent predictor of willingness to pay (H4.1), while geographic proximity mattered mainly for moderate WTP groups. Relational proximity was weak but functioned as an enabling condition that built trust. Purchase frequency was shaped primarily by geographic and value proximity (H4.2), while relational proximity reinforced loyalty but not routine purchasing.

## **Practical utility**

For practitioners, the findings confirm that “local” is not a single attribute but a **multidimensional construct**, supporting **proximity-profile segmentation**:

- **Geographic proximity** drives convenience and frequency, especially among lower-income groups.
- **Value proximity** drives willingness to pay, especially in higher-WTP segments.
- **Relational proximity** provides credibility and loyalty rather than direct behavioural outcomes.

This reflects Construal Level Theory (Trope and Liberman, 2010): abstract commitments like sustainability often fail to translate into action unless made tangible. Local food reduces this gap by offering concrete proximity experiences. Effective marketing therefore requires clear **value cues** (freshness, seasonality, traceability, tradition, fair farmer returns), paired with relational trust-building and accessible distribution. Demographic targeting is also key: older consumers resonate with

narratives of tradition, women are crucial household decision-makers, and lower-income groups need convenient and affordable access.

### **Policy utility**

The validated framework provides evidence for EU-level interventions in the CAP, Farm to Fork Strategy, labelling, procurement, and education programmes.

- **Accessibility:** Geographic proximity highlights the need for infrastructure and local market support, especially in underserved areas.
- **Value-based communication:** Value proximity as the strongest driver of behaviour calls for stronger labelling, procurement, and education to embed health, cultural, and sustainability values.
- **Relational proximity:** Although not a strong independent driver, it enables other dimensions to work; thus, CSA and cooperation schemes should treat trust as complementary.
- **Equity:** Income-related patterns stress that affordability and access must be combined with value literacy. Public procurement—especially in schools and hospitals—can deliver both.
- **Youth and gender:** Weaker proximity among young consumers underlines the need for experiential and digital programmes, while women’s higher scores support gender-sensitive initiatives and platforms.
- **Sustainability:** Consumers often equate “local” with “sustainable,” yet evidence is mixed. Policies should therefore promote seasonal produce, efficient logistics, and food waste reduction while correcting misconceptions.

This dissertation provides a **validated measurement scale**, reveals demographic differences, and clarifies the differentiated behavioural roles of proximity. For academics, it offers a foundation for theory-building; for practitioners, it supports segmentation and marketing; and for policymakers, it informs integrated interventions. Above all, it shows that “local” is a **dynamic, multidimensional construct** whose meanings evolve with cultural, social, and economic contexts.

Summary table of the research utility

Topic	Key Findings	Academic utility	Practical utility	Policy utility
<i>Concept of local food</i>	Local food perception is multidimensional (geographic, value, relational)	Empirically validates the three-factor proximity framework (H2.1); links to CLT to explain value–action gap	Enables proximity-profile segmentation; supports targeted marketing beyond “local = near”	Highlights the need for multidimensional policy design (access, values, trust)
<i>Model validation</i>	Three-factor model outperforms one-factor; validated by CFA	Provides a robust measurement scale for local food perception	Offers basis for consumer segmentation profiles	Evidence base for designing SFSC interventions
<i>Geographic proximity</i>	Drives purchase frequency and lower/median WTP; stronger among lower-income consumers	Demonstrates role of spatial access in behavioural models	Reduce frictions: convenient locations, opening hours, routine-proximate pick-up points	Invest in infrastructure and accessibility in underserved areas
<i>Value proximity</i>	Strongest and most consistent predictor of WTP (esp. higher quantiles) and purchase frequency; varies with age and income	Central construct for modelling behavioural commitment	Communicate concrete value cues (freshness, seasonality, traceability, welfare) at the point of decision	Promote food literacy; embed value cues in labelling, procurement, and education
<i>Relational proximity</i>	Weak/inconsistent direct predictor; functions as enabling condition	Shows trust is stable and not income-dependent; supports enabler role	Build trust as prerequisite, not stand-alone driver	Use as complementary tool (CSA, cooperation, Food Dialogues)
<i>Age differences</i>	Older groups perceive stronger value and relational proximity (H3.1)	Raises new research questions: life-cycle vs cohort effects	Storytelling, tradition, and producer identity resonate with older consumers	Youth-targeted programmes (school schemes, digital outreach) needed
<i>Gender differences</i>	Women score higher across all proximities (H3.2)	Confirms importance of gender-sensitive analysis in food studies	Dual-layer messaging: women as evaluators and key purchasers	Design programmes targeting women as consumers and producers
<i>Income differences</i>	Geographic and value proximity vary with income; relational stable (H3.3)	Challenges assumption that relational ties are income-bound	Combine access solutions with value translation for low-income groups	Improve accessibility and affordability in low-income/urban areas
<i>Willingness to pay (WTP)</i>	Value proximity strongest predictor; geographic matters at low/median levels; relational weak (H4.1)	Strengthens behaviourally grounded consumer choice models	Premium branding should emphasise value-based attributes	Support labelling and literacy schemes to foster sustainable choices
<i>Purchase frequency</i>	Driven by geographic and value proximity; relational proximity functions as trust precondition (H4.2)	Provides empirical foundation for segmentation by behavioural outcomes	Pair friction reduction (access) with consistent value reinforcement	Infrastructure and procurement reforms to sustain regular access

Source: *Self-edited table*

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